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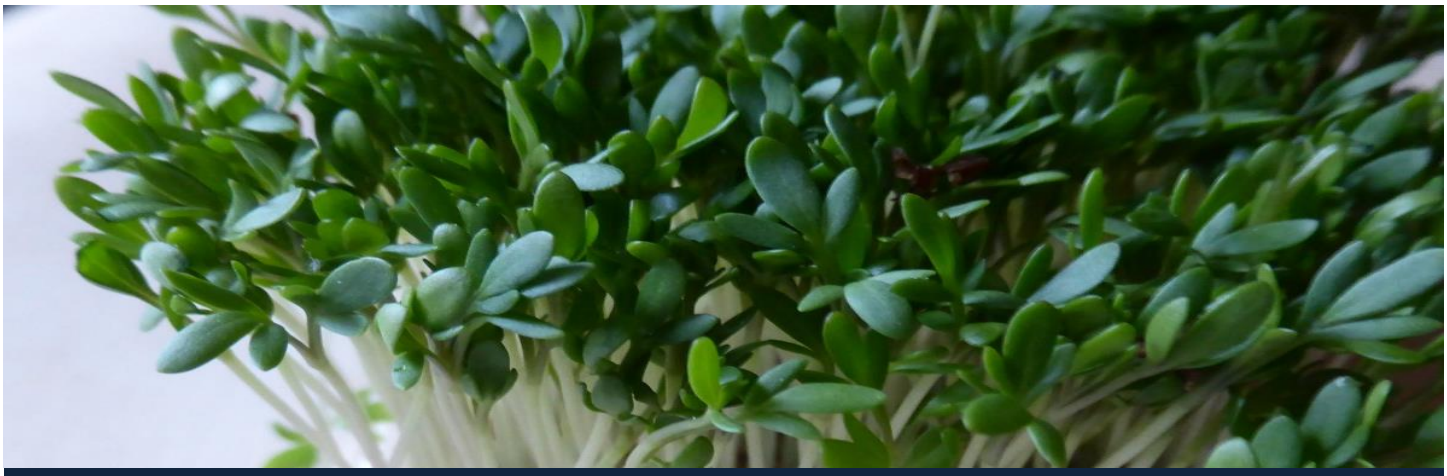


Harnessing the Anti-Cancer Properties of Vegetables to Prevent Melanoma ID: 2659

Featured Innovators: John Kirkwood, MD, Shivendra Singh, PhD, and Jan Beumer, PharmD, PhD

Melanomas are aggressive, frequently metastatic tumors responsible for 75 percent of skin cancer deaths. Advanced melanoma is generally difficult to treat, and a significant portion of patients will develop distant metastases even with early intervention. Given the continually rising incidence of melanoma — despite education about minimizing exposure to sunlight — there is a need for more effective prevention, especially in high risk individuals. Our plant-based oral drug could work together with behavioral modifications to minimize the risk of melanoma.

Technology Description

The key ingredient of our drug is sulforaphane (SFN), which is a naturally-occurring anti-cancer compound found in low concentrations in vegetables, such as broccoli, cabbage, and cauliflower. Using enzymatic digestion of broccoli sprouts, we prepared capsules to provide people with a fixed quantity of SFN. In mice, this formulation and dosage delayed melanoma progression. Additionally, we identified possible SFN-related biomarkers for the progression of atypical moles to melanoma. We tested these biomarkers in a randomized, comparative study in human subjects with melanoma-dependent atypical nevi — a precursor and risk factor for melanoma.

Advantages

- Potential to prevent the development of melanoma
- Natural product with no significant toxicity or side effects
- Delivered orally

Applications

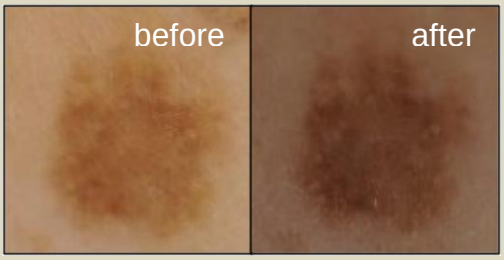
- Reduce the development of melanoma precursor lesions
- Slow the progression of atypical moles into melanoma
- Potentially applicable to other types of cancer

Stage of Development

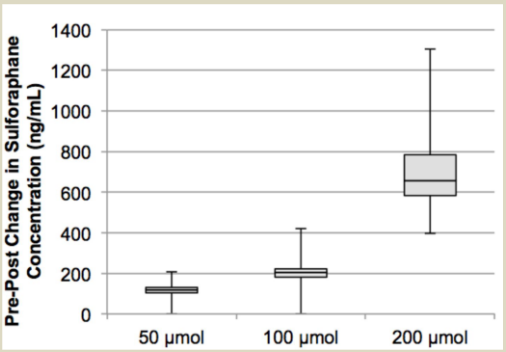
Phase I clinical trial complete

IP Status

U.S. Patent 9,393,225 issued



An example human atypical nevus shows a slight decrease in size after just 28 days of oral SFN treatment. On average, nevi increased in size over the study interval, but the degree of enlargement tended to be less for people who received a higher dose of SFN.



Oral SFN has a dose-dependent effect on plasma SFN concentration in humans.

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Innovators

John Kirkwood, MD

Professor of Medicine, Dermatology & Translational Science

Co-Leader, Melanoma and Skin Cancer Program

University of Pittsburgh

Dr Kirkwood's laboratory is engaged in the study of melanoma immunobiology. He is also engaged in the assessment of multiple new immunomodulators through trials conducted with the Hillman Melanoma Program, the SPORE in Melanoma and Skin Cancer, and the International Melanoma Working Group.

Education

MD, Yale University

Shivendra Singh, PhD

Professor and Chair, Cancer Prevention Research

Department of Pharmacology & Chemical Biology

University of Pittsburgh

Dr Singh's research revolves around glutathione transferases (GSTs), which play an important role in drug metabolism and cellular defense against environmental and dietary chemical carcinogens (e.g., polycyclic aromatic hydrocarbons or PAHs). The Singh laboratory is also interested in investigating the anticarcinogenic effects of certain natural agents found in edible plants, including organosulfides from garlic and isothiocyanates from cruciferous vegetables such as broccoli.

Education

PhD, Banaras Hindu University, India
MSc, Banaras Hindu University, India

Relevant Publications

- Tahata S, et al. (2018). Evaluation of biodistribution of sulforaphane after administration of oral broccoli sprout extract in melanoma patients with multiple atypical nevi. *Cancer Prevention Research*, canprevres-0268.
- Kirkwood JM, et al. (2016). Dose-response evaluation of brocolli sprout extract sulforaphane (BSE-SFN) in melanoma patients (Pts) with atypical/dysplastic nevi (A/DN). *Journal of Clinical Oncology*, 34(15).
- Lobur D, et al. (2012). Pilot evaluation of sulforaphane in melanoma patients with multiple atypical nevi: Tissue STAT1 and STAT3 as risk markers. *Journal of Clinical Oncology*, 30(15).

Jan H. Beumer, PharmD, PhD

Associate Professor of Pharmaceutical Sciences

Co-Director, Cancer Pharmacokinetics and Pharmacodynamics Facility

University of Pittsburgh

Dr. Beumer is intimately involved in the design, execution, supervision, and data analysis of numerous pharmacokinetic and metabolic studies of anti-cancer drugs covering the entire spectrum from preclinical to clinical phase II studies.

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